

Building a bibliography: some difficulties, with special reference to *Taxonomic literature*, ed. 2

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Abstract

It is rare that users of bibliographies consider the reasons that led their authors to write them in the first place. The second edition of *Taxonomic literature* (TL-2), as the most comprehensive guide to the publications of taxonomic botany and to biographical references concerning their authors, is no exception. It can be shown that it came about as the culmination of the establishment of the International Association for Plant Taxonomy (IAPT) and the various projects it generated over the first nearly 40 years of its existence. For the conception of the IAPT and TL-2, however, one must return to the first quarter of this century when H. N. Hall and A. S. Hitchcock jointly began to develop pressure for an International Bureau of Plant Taxonomy which would do all the things the IAPT has, in fact, accomplished.

With any bibliographic or historical undertaking, one must initially clearly define the ultimate purpose and audience for the completed work. The location of data to be included is nearly as difficult as choosing what to include and developing an efficient system for recording and ordering information is still another important consideration. All these suggested difficulties were compounded in TL-2 by the time frame of the work (1753 through 1939), by its scope (all groups of plants, fossil and Recent) and initially by the lack of credibility of the community for the project.

Despite the fact that I see myself more as a user of bibliographies and historical works than a producer, I have been asked to talk about some of the difficulties in locating, gaining access to, and recording historical and bibliographical data, with special reference to TL-2, the second edition of *Taxonomic literature* (Stafleu & Cowan 1976–1988), the seventh and last volume of which was published 3 March. But I would like to spend just a moment in these introductory words to ask why anyone writes bibliographies, for I think most of us just use them without giving a second thought to why they are undertaken in the first place. Then I will say something about why TL-2 was written.

One group of bibliographers we can identify easily: just as there are compulsive indexers, there are those who seem to derive great personal satisfaction from constructing bibliographies, and we bless them, whatever their motive. Many taxonomists, at least, build their own bibliographic tools because none exist and they are needed for their own research. Then there are those who have a deep interest in the historical development of an author or subject area. To some extent TL-2 partakes of all these reasons in a manifestly incomplete listing: we undertook what we thought was a three-volume, five year project because we sincerely believed that it was needed by all areas of systematic botany and at least I was of the opinion that Stafleu was, and is, one of the few people, perhaps the only person, in this period of botanical history who could write such a work and was willing to do so. In his preface to the seventh volume, Stafleu explains that we were able to make the book more comprehensive, seven volumes instead of three, because we were both

willing to devote essentially all our research time for several years to the project.

TL-2 came about as a logical outgrowth of, indeed was only possible because of, various activities of the International Association of Plant Taxonomists (IAPT) that were presaged as early as the first proposals for an International Bureau for Plant Taxonomy, especially by H. M. Hall and A. S. Hitchcock. Just as Darwin had encouraged J. D. Hooker and Kew to undertake the *Index kewensis* because of the need he experienced in his own work, Hall and Hitchcock attempted as early as 1930 to sell the idea of an International Bureau to meet special problems they encountered. It was not until at the 1950 Stockholm Congress, however, that the IAPT was initiated. Work with the *International code of botanical nomenclature* (Greuter *et al.* 1988), the *Index nominum genericorum* (Farr *et al.* 1979), the *Index herbariorum*, parts I and II (Holmgren *et al.* 1981; Lanjouw *et al.* 1954-x), as well as, and in particular, TL-1 (Stafleu 1967), all brought together the kind of data required to undertake a TL-2.

Few accomplishments are made without personal commitments, personal motivations. In the case of TL-1, it was Stafleu, harkening to the urging of Grady Webster (University of California, Davis) who made available the contents of the card file on his desk. The personal context for TL-2 was completely different, for it grew out of conversations in 1974, concerning what we would do with the rest of our lives. I had already put down my administrative responsibilities and Stafleu was ready to follow suit with his; we concluded that a second edition of *Taxonomic literature* would be easily

the best use of the next several years, both from the stand-point of personal satisfaction and of service to the botanical community. I had no expectation at that time of being involved and neither of us had even a vague notion at the beginning that it would take 14 years and seven volumes to do the job right.

Locating data

Locating bibliographic/historical data requires, first of all, decisions concerning what data are wanted, which would have seemed to be a simple task for TL-2; in the first edition it was extremely simple, for it consisted of Stafleu deciding that the contents of his card file that had accrued from his own taxonomic work, as well as that with H. W. Rickett on the *Code*, would be the basis of that very helpful book. It treated primarily books in the usual sense of the word but in TL-2, sometime around volume two or three, we realized that we were omitting many very important works for taxonomy by ignoring journal publications. To have attempted to include all of them was patently absurd. There were at least two classes of such publications we did include from about volume three onward: (1) papers published in parts, often in different journals, and (2) reprints or preprints with independent pagination. Having opened Pandora's box, the number of journal articles included was determined in the end largely by those we came across, although we tried to sort out and include the more significant ones, leaving the dross for the TL-2 files.

The *Catalogue of scientific papers* (1867–1925) lists most 18th century publications of this sort but the single most important source of such titles for TL-2 was the reprint collection at the Conservatoire botanique in Geneva. Many hundreds of bound volumes of catalogued reprints and preprints from authors around the world form an unexcelled bibliographic resource that should not be overlooked when searching for titles otherwise unavailable.

For botanical books there are a number of well-known sources which list in one form or another many of the publications that have appeared over the last couple of hundred years, such as Pritzel's *Thesaurus literaturae botanicae* (1847–1852), B. D. Jackson's *Guide to the literature of botany* (1881), the catalogue of the British Museum (Natural History) library, the *Bibliographie de la France* (1813-x), and Australian sources such as Nancy Burbidge's *Australian botanical literature* (1978), the catalogues of the Mitchell Library in Sydney, the State Library in Melbourne, and the University of Western Australia and Alexander Libraries in Perth. It is interesting, indeed surprising for me at least, that even when one puts all these, and still others together, there are still many works that escaped inclusion in the standard bibliographies. Initially, we drew up lists of authors and their publications, taken from Pritzel, Jackson and the rest; we took these lists when we went to our key libraries so that we could find the books and collect data on them. Then we realized from working at the super-rich U.S. Dept. of Agriculture (USDA) library in suburban Washington, following these lists of authors and their works, that for every book on the list there were several times as many on the shelves that had not appeared in the earlier bibliographies but which were equally valuable! It was like finding nuggets among the grains and

flakes of gold at the bottom of the washing pan! Now the USDA library is 14 storeys high; ten of the floors are devoted to actual library shelving and about two or three of them are filled with shelves of publications of conceivable importance to taxonomic botany. I ended by spending a couple of hours every evening for the next several years in the library, after hours, with all facilities available for recording data, taking down every book from the shelf and looking at it long enough to decide whether it was potentially useful for plant taxonomists, worth capturing its data. We discovered that such unrecorded works are to be found in every botanical library of reasonable age and size. Later, for example, much later than we would have liked, we started using the State Library in Berlin (Pritzel's home base), which is a Mother Lode of such literature and we did all we could with the publications of authors in the latter, perhaps one-third of the alphabet. So the first difficulty in preparing such a bibliography is knowing that a particular work even exists.

By way of summary of this point then, we began with cumulative lists of authors and their works, derived from card files of the entries in Pritzel (1847–1852), Jackson (1881), and all the rest, photocopied page by page and the entries cut apart to be glued to individual cards. To this we added what we found in the shelf — by shelf search of libraries at Brussels, Geneva, Utrecht, Washington, St Louis, New York, Cambridge (U.S.A) and Philadelphia, to which were added the multitude of items called to our attention by volunteer collaborators at Chicago, Pittsburgh, Berkeley, Lund, Göteborg, Helsinki, Munich, Florence, Göttingen, and Berlin. A full listing of libraries and of collaborators will be found in the epilogue in volume seven. One might think that TL-2 is meant to be a bibliography to end the need for further ones but everyone here probably knows that it is not complete and in fact, as the subtitle indicates, it is intended as a selective guide rather than the last word. I can tell you that my phyecological spouse complains that there are many missing works on algae and our young two-year old is totally unimpressed with TL-2 because of the lack of pictures! (Everyone's a critic these days!)

Accessibility and recording of library resources

Reactions, mostly on the part of librarians, to our need to gain access to the works we wished to include ranged from apathy to enthusiasm, depending on their vision and potential involvement. The whole idea of building a bibliography for all groups of plants, fossil and Recent, from 1753 through 1939 was a bit staggering, so much so that initially we had difficulty convincing anyone, especially the grant-giving agencies, that we were not embarked on an impossible journey. For that reason we pushed along the first volume as rapidly as thoroughness and accuracy permitted, to have a sample of what we intended to finish, in order to convince everyone of the seriousness of the project. I am going into these details because I believe they have a lot to do with gaining access to library resources. Once volume one had appeared attitudes began to change and, by the latter stages, the U.S. National Science Foundation was willing, perhaps it is not too strong to say eager, to provide the resources that would ensure completion of the work.

I referred earlier to the U.S. Dept. of Agriculture library: there was certainly no difficulty of access because it is an open, taxpayers' institution but I was fortunate to get the ear of one of the administrators to point out how much we needed to do there in the way of data capture and she understood. Especially she understood that if their staff had to service my requests for help they would get little else done but, if they gave me free access to the shelves and to all the equipment, their cooperation would cost them very little indeed. From the beginning the libraries of the New York Botanical Garden and the Missouri Botanical Garden were freely available along with all the staff support we required. In Europe there are many outstanding botanical libraries and we had the full support of those at Berlin, Brussels, Munich, and Geneva, but some of the more obvious ones, like those in London and Paris were more difficult, for different reasons I must explain by sketching our methods for recording data.

Although Pritzel captured data for the *Thesaurus literaturae botanicae* in handwriting on cards, it is clear that TL-2 would not have been possible without access to photocopying equipment and where it was not available we simply did not try to work. Basically, we photocopied the title page and other pages that would enable us to date the book, at least approximately, and then wrote bibliographic details in stable inks on the title-page photocopy, such obvious details as pagination, plates, format, as well as less obvious ones, name of the illustrators, how the plates were made, and of course the abbreviation for the institution responsible for the library. This may not be a perfect data-collection scheme but it works and moreover, sources for TL-2 data can be rechecked when necessary, because these sheets were intended to be a long-time, if not permanent, record, of the data used. I'll say a bit more about these files at the end of my remarks.

I have to say that we didn't attempt to work in the Paris libraries and we gave up working at the BM and at Kew because of the difficulties of obtaining photocopies on the spot for our system of operation. For obvious reasons, but mainly the lack of freely available copying equipment, we also didn't attempt to work at either Moscow or Leningrad which would have been very rewarding I am sure. We ended the project with perhaps two million sheets of A4 and/or A3 paper; while I have not checked the accuracy of the computations, Stanley Greene, the British bryologist and frequent user of TL-2 files, estimated some time ago that if one piled the sheets atop one another, the top of the stack would just reach the level of Stafleu's 19th storey office!

Another difficulty of access to such data which one may encounter but which can be overcome is that of access to the contents of private libraries or libraries which are not ordinarily open to the public. The John Crerar Library in the Chicago area was a good example of a very rich collection which could be used only by people in the area with permission and requests for assistance by mail simply were not answered. We got around that problem by enlisting the assistance of John Engle at the Field Museum to search out particularly rare items that we knew were there from the listing in the catalogue of the National Library of Con-

gress. Parenthetically, I could mention difficulty of access to Rare Book Libraries in general because they are often guarded by dedicated men and women who do their best to keep potential users at bay; to deal with this particular impediment, I leave you to your own devices! I doubt that either Stafleu or I will ever forget the Rare Book Librarian at a university in the U.S.A. who accused Stafleu of 'throwing books around' after one volume had slid off another on the work table!! The Hunt Library of the Carnegie University in Pittsburgh is another, quite different, example of a private library. It is a rich, personal collection that was given by Rachel Masters Hunt to a public institution where scholars are welcomed to use it and any reasonable request for assistance is filled promptly. Then there is the Library of Congress: there is a good example of a library where working in the stacks, which we had to do if we were to finish the job in our lifetimes, was possible largely by using our wits to circumvent the antiquated, cumbersome bureaucracy that characterizes that institution. It is such a vast collection in so many separate buildings and annexes that one needs first to be a geographer to avoid being hopelessly lost in the miles of stacks. Still another kind of private library are those of botanist friends and associates who in all cases were enormously helpful in every way; for example Paul Silva's algological library, Joseph Ewan's library of early Americana, William Steere's bryological library, John Stevenson's mycological library at the National Fungus Collections in suburban Washington D.C. and John Wurdack's private library of Latin American travel and exploration books.

Biographical face of TL-2

At this point I have said something about how one may go about building a bibliography, what to record and one method of recording it, and difficulties of access, but I now turn to the other face of TL-2, the biographical one, for one comes to understand, in various ways, the literature of the authors included when something is known about them. Their birth/death dates help to identify the author; their education and regular occupation often reveals or suggests insights into their publications. Sometimes one does not have to look far for information about some 19th century authors, for in very small print under the author's name on a title-page often appears all the honorary and real titles the author claims, and the list can get quite lengthy. One may even conclude that modesty was not then an altogether cherished personal trait, but one French author whose book we were looking at in the Geneva library for possible inclusion really seemed to be 'taking the micky' out on his colleagues — I apologize for not having a photocopy of that title page because then I could verify this tale. Following his name on the title page, in very small print, he explains, in paraphrase as I remember it, that he is neither director nor has he ever been director of any botanical garden or other botanical establishment, he is Fellow of no learned societies, he has as patrons no great names, he has been awarded no national or international prizes for his botanical work. No, he has none of these claims to fame, the only thing he can claim is a love of plants and of botany!

There are a great many sources of information about people in all fields of science but if the other areas are

anything like botany, you will look very hard indeed for details about the lives of women practitioners of the science. You very often can discover whom they married, especially if the spouse happens to be a botanist of note. If you look through TL-2, you will see that our data are often incomplete on women botanists, even on their birth and death.

You will recognize the titles of such well-known biographical sources as Ray Desmond's *Dictionary of British and Irish botanists and horticulturists* (1977), the *Dictionary of national biography* (Stephen & Lee 1885–1900), *American men and women of science* (Jacques Cattell Press, New York), the various *Who's Who* and the *Australian dictionary of biography* (Shaw & Clark 1966-x). They need only be mentioned in passing but there are so many more when you are working internationally, such as John Barnhart's *Biographical notes upon botanists* (1965), the *Dictionnaire de biographie française* (1813-x), *Flora malesiana*, *Flora brasiliensis* (Martius 1906), Lasegue's *Musee botanique de M. Benjamin Delessert* (1845), Lipschitz's *Botanicorum rossicorum lexicon bibliographicum* (1947–1951) in four volumes, M. Moebius's *Geschichte der botanik* (1937), Poggen-dorf's *Biographisch-literarisches handwörterbuch* (1965-x) and Zander's *Handwörterbuch der pflanzen-namen* (1984), just to name a few of the ones we used for TL-2.

Still another source of such biographical data are the botanical journals, especially those before this century where every issue contained detailed notes on the travels and plans of botanists, honours bestowed, and their inevitable death notices. In journals one also finds such gems as those by J. H. Maiden in which he gave biographical notes on a great many of Australia's botanists to that time. To capture this information we went through many journals from their beginning, often to their demise, photocopying pages of news and notes, sometimes ten copies of a page if there were ten botanists mentioned, so that one copy could be filed under each of the ten names. For example I went through 141 volumes of *Botanisches centralblatt* for both biographic and bibliographic data, but there was also *Mycologia*, *Bulletin de la Société botanique de France*, *Botanische Zeitung*, *Flora*, *Grevillea*, *Bonplandia*, *Candollea* and many more. In some ways the biographic data were as interesting as the publications, superficially anyhow, and they constitute a unique characteristic of TL-2. Most of you in using the book will know that the first paragraph of an author's entry is a short diagnosis, as we called it, giving the most salient points about the author, followed by a list of references to further biographical information, each of which usually lead to still other references. So these paragraphs are a rich source for those who would do biographical studies in depth.

Herbaria and types

Another sort of problem we all use TL-2 to solve is where the herbarium and types of included authors are located and such information is often very difficult to locate. We are all familiar with sources such as Kent's *British herbaria* (1957), Clouke's *An account of herbaria at the University of Oxford* (1964), and part two of *Index herbariorum* — the IAPT *Collectors index* (Lanjouw *et al.* 1954–1988), the writing of which, inci-

dentally, is now completed. Another very interesting source, not always something that immediately comes to mind is Lasegue's (1845) book on the collections in the Museum of Benjamin Delessert. Journal notices of the death of a botanist not infrequently gave information concerning the fate of his collection and/or types. When the IAPT collected information on holdings of herbaria for the first edition of *Index herbariorum*, enormous numbers of data on the location of herbaria came together, much of it for the first time.

Abbreviations of book titles

I will leave you with one last story which has to do with the abbreviations of short titles of books which I am pleased to see are being used even though the author abbreviations have been pretty well ignored. We arrived at the abbreviations of book titles in the deliberations of a small committee of four that met as needed and when a volume was due to be completed, it was often daily for several weeks. In the course of working on volume one the committee spent endless time on ground rules which changed by the day; every name was a debating contest! Finally in exasperation, when we arrived at the entry for Bastard, I wrote in the margin of the proof that the committee suggested it be cited as S.O.B. We laughed and went on but when the volume appeared there is a note by the senior author 'The abbreviation S.O.B. for the name of this author would be wholly undeserved.' The real kicker comes in the index to names where our colleague at Utrecht who did those indexes lists 'S.O.B. v. Bastard, T.' There are not many light moments in TL-2, only one plate but, regrettably, errors of both omission and commission.

TL-2 files

I spoke earlier of the TL-2 files being permanent, by which I mean that the about two million pieces of paper, all our notes etc. constitute a unique biographic and bibliographic resource that will be curated by the New York Botanical Garden and made available to researchers. It should be noted that there are many times as many data in that file as there are in the seven volumes. I say this because a photocopy of a 30-page biography of an author may appear in TL-2 as half a line or less, just a reference to the existence of the biography. And we collected data on many more authors than appear in the work, at least partly because we collected data on all authors, A to Z, from the beginning and information about authors in the A-G volume continued to accumulate while we were working on the W-Z volume at the end.

This may be as good a place as any to answer a few questions frequently asked by colleagues and which perhaps some of you may have wondered at as well. We are often asked how does one organize such enormous numbers of data from so many sources in a way they can be retrieved easily. I showed you earlier the photocopy of the annotated title page of one volume of the *Flora U.S.S.R.* (Komarov *et al.* 1934–1960) as an example of our data-gathering methods for books. These annotated photocopies with the surname of the author(s) highlighted were sorted on author's name, alphabetically, just as the book is organized. All the alphabetized secondary references on hundreds of thousands of photocopy sheets were arranged in the

last stages, just before the treatment of an author was written, in the order of the paragraphs in the book: the author diagnosis, data on the subject's herbaria and types, biographical references, eponymy and finally the books and papers produced by the author which have possible use to taxonomists. This order will be preserved in the TL-2 files at New York so that workers can readily identify the source of statements in the text, as well as exhumed countless data that failed the TL-2 tests for inclusion.

Electronic Technology

Electronic technology has played a definite role in the completion of the job in what would have been otherwise a much more laborious task, as explained in the introduction to volume four. The first three volumes were produced from typewritten manuscript but already by volume two, the technology had improved and an early phototype composer was used for volume two and a laser-composer for volume three. With the cooperation and support of the printers who supplied what was then a very sophisticated word processing array, we began with volume four, in effect, to set type ourselves because the magnetic disks prepared by the typist drove the laser-scanner at the printers to produce the printed output. It was this 'proof' that was compared a character at a time with the handwritten manuscript for errors; corrections were made on the disk and the book was ready for final printing, thereby enabling us to have a volume published about every two years.

So often we are asked about a TL-2 supplement or a TL-3 that I must say something briefly on these matters. The short answer is that the authors of TL-2 will not add to that work in any way but we encourage any who will to send corrections to the Library of the New York Botanical Garden. At one time, much earlier, we had planned to bring out a reworking of volume one, whose coverage was about one-third as complete as the later volumes, as a kind of supplement but we soon realized that was not practical in our lifetimes. As we drew closer to the conclusion of TL-2, I have dared dream that younger hands would convert the contents of TL-2 to an electronic data base which could then be supplemented, corrected and maintained indefinitely as an international resource that would be addressed by satellite, just as we dial telephone numbers around the world from our desk even now. After the first period of data-base building when a substantial infusion of funds would be required, one would have to find a stable institutional base and a commitment to the regular fiscal support that would be needed for maintaining the file. In my opinion there will never be a TL-3 of any other sort.

Division of labour

One final question that is asked is the division of labour between the authors. Nearly all the writing was done by Stafleu, for he is the bibliographer, the historian. We both worked at the collection of data but the many tasks to see each volume through the press were his. My contribution was primarily data collection and organization but I also did most of the analyses of multi-volume works such as the *Pflanzenfamilien* (Engler & Prantl 1887–1915) and the *Flora U.S.S.R.* (Komarov *et al.* 1934–1960). I also did all the

detailed proof-reading and I can tell you that the end of that task on 3 August 1987 was nearly as exciting as the publication of the last volume! We know that neither of us could have done the job without the other, for quite different reasons, so it was truly a collaborative project in the fullest sense of the word. I have mentioned a number of collaborators in Europe and the U.S. principally but we should not forget the several assistants provided by research grants from the U.S. and Dutch governments, as well as the support of our home institutions, the Smithsonian Institution and the University of Utrecht.

It has been a long, often arduous road to the end of this task but we are continually rewarded by comments in letters, and directly, on the usefulness of the work, so we can look back on 14 years of its production with feelings of accomplishment. The last volume appeared 3 March and the index to titles volume will appear in the near future. Statistics in the last volume indicate that we consulted 101 libraries in presenting a total of 16,614 publications by 6,186 authors. As a working taxonomist who participated in this epic bio-bibliography I am very satisfied, especially when I find the information I need on publications and their authors in connection with my present work on some of the wattles for the *Flora of Australia*.

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